

WEPD – Type I [64, 32, 12]

This is a database of known weight enumerator parameters for singly-even binary self-dual [64, 32, 12] codes.

The possible weight enumerators of a singly-even binary self-dual [64, 32, 12] code are given in [6] as

$$\begin{aligned}W_{64,1}^I &= 1 + (1312 + 16\alpha)x^{12} + (22016 - 64\alpha)x^{14} + \dots, \\W_{64,2}^I &= 1 + (1312 + 16\alpha)x^{12} + (23040 - 64\alpha)x^{14} + \dots,\end{aligned}$$

where $\alpha \in \mathbb{Z}$.

See the links below for lists of known values of α for $W_{64,1}^I$ and $W_{64,2}^I$.

- [W_{64,1}^I known parameters](#) (from [1–5, 8, 10, 14, 17, 18, 20, 22, 23])
- [W_{64,2}^I known parameters](#) (from [1, 3, 5–7, 9–17, 19, 21–24])

References

- [1] D. Anev, M. Harada, and N. Yankov. New extremal singly even self-dual codes of lengths 64 and 66. *J. Algebra Comb. Discrete Struct. Appl.*, 5(3):143–151, 2018. doi: [10.13069/jacodesmath.458601](https://doi.org/10.13069/jacodesmath.458601).
- [2] K. Betsumiya, T. A. Gulliver, M. Harada, and A. Munemasa. On type II codes over \mathbb{F}_4 . *IEEE Trans. Inform. Theory*, 47(6):2242–2248, 2001. doi: [10.1109/18.945245](https://doi.org/10.1109/18.945245).
- [3] S. Buyuklieva. A method for constructing self-dual codes with applications to length 64. “*Proceedings of the Fifth International Workshop on Algebraic and Combinatorial Coding Theory*”, Sozopol, Bulgaria, pages 81–85, 1996.
- [4] S. Buyuklieva. On the binary self-dual codes with an automorphism of order 2. *Des. Codes Cryptogr.*, 12(1):39–48, 1997. doi: [10.1023/A:1008289725040](https://doi.org/10.1023/A:1008289725040).
- [5] N. Chigira, M. Harada, and M. Kitazume. Extremal self-dual codes of length 64 through neighbors and covering radii. *Des. Codes Cryptogr.*, 42(1):93–101, 2007. doi: [10.1007/s10623-006-9018-5](https://doi.org/10.1007/s10623-006-9018-5).
- [6] J. H. Conway and N. J. A. Sloane. A new upper bound on the minimal distance of self-dual codes. *IEEE Trans. Inform. Theory*, 36(6):1319–1333, 1990. doi: [10.1109/18.59931](https://doi.org/10.1109/18.59931).
- [7] R. Dontcheva and M. Harada. Some extremal self-dual codes with an automorphism of order 7. *Appl. Algebra Engrg. Comm. Comput.*, 14(2):75–79, 2003. doi: [10.1007/s00200-003-0126-4](https://doi.org/10.1007/s00200-003-0126-4).
- [8] J. Gildea, H. Hamilton, A. Kaya, and B. Yildiz. Modified quadratic residue constructions and new extremal binary self-dual codes of lengths 64, 66 and 68. *Inform. Process. Lett.*, 157, 2020. doi: [10.1016/j.ipl.2020.105927](https://doi.org/10.1016/j.ipl.2020.105927).
- [9] J. Gildea, R. Taylor, A. Kaya, and A. Tylyshchak. Double bordered constructions of self-dual codes from group rings over Frobenius rings. *Cryptogr. Commun.*, 12(4):769–784, 2020. doi: [10.1007/s12095-019-00420-3](https://doi.org/10.1007/s12095-019-00420-3).
- [10] J. Gildea, A. Korban, A. Kaya, and B. Yildiz. Constructing self-dual codes from group rings and reverse circulant matrices. *Adv. Math. Commun.*, 15(3):471–485, 2021. doi: [10.3934/amc.2020077](https://doi.org/10.3934/amc.2020077).
- [11] J. Gildea, A. Korban, and A. M. Roberts. New binary self-dual codes of lengths 56, 58, 64, 80 and 92 from a modification of the four circulant construction. *Finite Fields Appl.*, 75, 2021. doi: [10.1016/j.ffa.2021.101876](https://doi.org/10.1016/j.ffa.2021.101876).
- [12] T. A. Gulliver and M. Harada. Classification of extremal double circulant self-dual codes of lengths 64 to 72. *Des. Codes Cryptogr.*, 13(3):257–269, 1998. doi: [10.1023/A:1008249924142](https://doi.org/10.1023/A:1008249924142).
- [13] T. A. Gulliver, M. Harada, and J.-L. Kim. Construction of new extremal self-dual codes. *Discrete Math.*, 263(1–3):81–91, 2003. doi: [10.1016/S0012-365X\(02\)00570-8](https://doi.org/10.1016/S0012-365X(02)00570-8).
- [14] S. Karadeniz and B. Yildiz. Double-circulant and bordered-double-circulant constructions for self-dual codes over R_2 . *Adv. Math. Commun.*, 6(2):193–202, 2012. doi: [10.3934/amc.2012.6.193](https://doi.org/10.3934/amc.2012.6.193).

- [15] S. Karadeniz and B. Yildiz. New extremal binary self-dual codes of length 64 from R_3 -lifts of the extended binary Hamming code. *Des. Codes Cryptogr.*, 74(3):673–680, 2015. doi: [10.1007/s10623-013-9884-6](https://doi.org/10.1007/s10623-013-9884-6).
- [16] S. Karadeniz, B. Yildiz, and N. Aydin. Extremal binary self-dual codes of lengths 64 and 66 from four-circulant constructions over $\mathbb{F}_2 + u\mathbb{F}_2$. *Filomat*, 28(5):937–945, 2014. doi: [10.2298/FIL1405937K](https://doi.org/10.2298/FIL1405937K).
- [17] A. Kaya. New extremal binary self-dual codes of lengths 64 and 66 from R_2 -lifts. *Finite Fields Appl.*, 46: 271–279, 2017. doi: [10.1016/j.ffa.2017.04.003](https://doi.org/10.1016/j.ffa.2017.04.003).
- [18] A. Kaya, B. Yildiz, and A. Pasa. New extremal binary self-dual codes from a modified four circulant construction. *Discrete Math.*, 339(3):1086–1094, 2016. doi: [10.1016/j.disc.2015.10.041](https://doi.org/10.1016/j.disc.2015.10.041).
- [19] T. Nishimura. A new extremal self-dual code of length 64. *IEEE Trans. Inform. Theory*, 50(9):2173–2174, 2004. doi: [10.1109/TIT.2004.833359](https://doi.org/10.1109/TIT.2004.833359).
- [20] V. Pless, V. Tonchev, and J. Leon. On the existence of a certain $(64, 32, 12)$ extremal code. *IEEE Trans. Inform. Theory*, 39(1):214–215, 1993. doi: [10.1109/18.179361](https://doi.org/10.1109/18.179361).
- [21] A. M. Roberts. Self-dual codes from a block matrix construction characterised by group rings, 2023. (in submission).
- [22] N. Yankov. Self-dual $[62, 31, 12]$ and $[64, 32, 12]$ codes with an automorphism of order 7. *Adv. Math. Commun.*, 8(1):73–81, 2014. doi: [10.3934/amc.2014.8.73](https://doi.org/10.3934/amc.2014.8.73).
- [23] N. Yankov and D. Anev. On the self-dual codes with an automorphism of order 5. *Appl. Algebra Engrg. Comm. Comput.*, 32(2):97–111, 2021. doi: [10.1007/s00200-019-00403-0](https://doi.org/10.1007/s00200-019-00403-0).
- [24] N. Yankov, M. Ivanova, and M. H. Lee. Self-dual codes with an automorphism of order 7 and s -extremal codes of length 68. *Finite Fields Appl.*, 51:17–30, 2018. doi: [10.1016/j.ffa.2017.12.001](https://doi.org/10.1016/j.ffa.2017.12.001).